

## **Selective One-Way Bit-Driving Apparatus**

### **Field of Invention**

The present invention relates to a selective one-way bit-driving apparatus.

### **Background of Invention**

Referring to Figure 8, a conventional selective one-way bit-driving apparatus 70 is provided between a handle 72 and a bit 74. The selective one-way bit-driving apparatus 70 includes a shaft 76 and a bit receiver 78. The shaft 76 includes a first section for connection with the handle and a second section. The bit receiver 78 includes a first space for receiving the second section of the shaft 76 and a second space for receiving the bit 74. Teeth 79 are formed on the wall of the first space of the bit receiver 78. The shaft 76 drives the bit receiver 78 in selective one of two directions through two one-way drivers 80. A detent 82 is installed on the second section of the shaft 76. A switch 84 in the form of a ring is provided around the first section of the shaft 76. The switch 84 includes two recesses 86 in an internal face in order to receive the selective one-way drivers 80. Moreover, the switch 84 includes, in the internal face, three recesses 88 selective one of which receives the detent 82 in order to keep the switch 84 in selective one of three positions on the second section of the shaft 76. Each of the one-way drivers 80 is engaged with the teeth 79 at only one point. The form of the one-way drivers 80 is not compliant with that of the teeth 79. These factors allow the one-way drivers 80 and the teeth 79 to slide relative to and wear away each other. Hence, this engagement cannot transmit adequate torque

1 from the shaft 76 to the bit receiver 78.

2  
3 The present invention is therefore intended to obviate or at least alleviate  
4 the problems encountered in prior art.

5  
6 **Summary of Invention**

7 It is an objective of the present invention to provide a robust selective  
8 one-way bit-driving apparatus.

9  
10 It is another objective of the present invention to provide a reliable  
11 selective one-way bit-driving apparatus.

12  
13 According to the present invention, a selective one-way bit-driving  
14 apparatus includes a shaft for connection with a handle, a bit receiver  
15 including a plurality of teeth formed on an internal face, two one-way  
16 drivers pivotally connected with the shaft and each formed with a  
17 plurality of teeth for engagement with the teeth of the bit receiver and a  
18 switch installed on the shaft for causing the engagement of the teeth of at  
19 least one of the one-way drivers with the teeth of the bit receiver.

20  
21 Other objects, advantages and novel features of the present invention will  
22 become more apparent from the following detailed description referring  
23 to the attached drawings.

24  
25 **Brief Description of Drawings**

26 The present invention will be described via detailed illustration of two

1   embodiments referring to the drawings.

2

3   Figure 1 is a perspective view of a selective one-way bit-driving  
4   apparatus according to a first embodiment of the present invention.

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6   Figure 2 is an exploded view of the selective one-way bit-driving  
7   apparatus shown in Figure 1.

8

9   Figure 3 is a cutaway view of the selective one-way bit-driving apparatus  
10   shown in Figure 1.

11

12   Figure 4 is a cross-sectional view of the selective one-way bit-driving  
13   apparatus shown in Figure 1.

14

15   Figure 5 is similar to Figure 4 but shows the selective one-way bit-driving  
16   apparatus in a different position.

17

18   Figure 6 is similar to Figure 5 but shows the selective one-way bit-driving  
19   apparatus in a different position.

20

21   Figure 7 is an exploded view of a selective one-way bit-driving apparatus  
22   according to a second embodiment of the present invention.

23

24   Figure 8 is an exploded view of a conventional selective one-way  
25   bit-driving apparatus.

26

1    **Detailed Description of Embodiments**

2    Referring to Figure 1, according to a first embodiment of the present  
3    invention, a selective one-way bit-driving apparatus 10 is engaged with a  
4    handle 60 in order to drive a bit (not shown).

5

6    Referring to Figure 2, the selective one-way bit-driving apparatus 10  
7    includes a shaft 20 for connection with the handle 60, a bit receiver 30 for  
8    receiving the bit, two one-way drivers 40 each enabling the shaft 20 to  
9    drive the bit receiver 30 in only one direction and a switch 50 that can be  
10   manipulated so as to select one from the one-way drivers 40 for  
11   operation.

12

13   Referring to Figures 2 and 3, the shaft 20 defines an axial tunnel 26.  
14   The shaft 20 includes a first section 21 and a second section 22 with an  
15   external diameter greater than that of the first section 21. On the first  
16   section 21 are formed four rows of protrusions 23 for holding on to the  
17   handle 60 when the first section 21 is inserted in the handle 60. Two  
18   recesses 24 are defined in the periphery of the second section 22. Two  
19   recesses 46 are defined in the periphery of the second section 22. A hole  
20   47 is communicated with each of the recesses 24. A rod 48 extends  
21   from the bottom of each of the holes 47. A spring-biased detent 28 is  
22   installed on the periphery of the second section 22. A restraint 29 is  
23   formed on the periphery of the second section 22.

24

25   The bit receiver 30 includes a first section 31 and a second section 32.  
26   The first section 31 defines a space 36. A plurality of teeth 33 is formed

1 on the wall of the space 36. The second section 32 of the bit receiver 30  
2 defines a screw hole 35 communicated with the space 33 and a space 34  
3 for receiving the bit.

4  
5 Each of the one-way drivers 40 includes a hollow cylinder 41, a tab 43  
6 formed on the hollow cylinder 41 and a plurality of teeth 42.

7  
8 The switch 50 is in the form of a ring with an internal face in which a  
9 groove 51, three recesses 52 and two grooves 53 are defined. The  
10 groove 51 includes two ends. Each of the grooves 53 includes two ends.

11  
12 The hollow cylinders 41 are inserted in the holes 47. The rods 48 are  
13 inserted in the hollow cylinders 41. Thus, the one-way drivers 40 are  
14 pivotally connected with the shaft 20. The one-way drivers 40 are put in  
15 the recesses 24. A spring 27 is compressed between each of the  
16 one-way drivers 40 and the second section 22 of the shaft 20. The  
17 springs 27 are put in the recesses 46. The one-way drivers 40 and the  
18 second section 22 of the shaft 20 are put in the space 36. The teeth 42  
19 can be engaged with the teeth 33. A screw 25 is driven into the screw  
20 hole 35 through the axial tunnel 26 so as to hold the shaft 20, the bit  
21 receiver 30 and the one-way drivers 40 together. The switch 50 is put  
22 rotationally around the first section 21 of the shaft 20. The groove 51  
23 receives the restraint 29 so as to limit the rotation of the switch 50 around  
24 the first section 21 of the shaft 20 within a range. Selective one of the  
25 recesses 52 receives the spring-biased detent 28. The grooves 53  
26 receive the tabs 43 for limiting the pivoting of the one-way drivers 40

1    within a range.

2

3    Figure 4 shows the teeth 43 of the one-way driver 40 on the right engaged  
4    with the teeth 33. Thus, the shaft 20 can drive the bit receiver 30  
5    counterclockwise through the one-way driver 40 on the right.

6

7    Figure 5 shows the teeth 43 of the one-way drivers 40 engaged with the  
8    teeth 33. Thus, the shaft 20 can drive the bit receiver 30 in two opposite  
9    directions through the one-way drivers 40.

10

11   Figure 6 shows the teeth 43 of the one-way driver 40 on the left engaged  
12   with the teeth 33. Thus, the shaft 20 can drive the bit receiver 30  
13   clockwise through the one-way driver 40 on the left.

14

15   Figure 7 shows a selective one-way bit-driving apparatus according to a  
16   second embodiment of the present invention. The second embodiment  
17   is identical to the first embodiment except for including leaf springs 27'  
18   instead of helical springs 27.

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20   The present invention has been described via detailed illustration of the  
21   embodiments. Those skilled in the art can derive variations from the  
22   embodiments without departing from the scope of the present invention  
23   defined in the claims.

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